4501

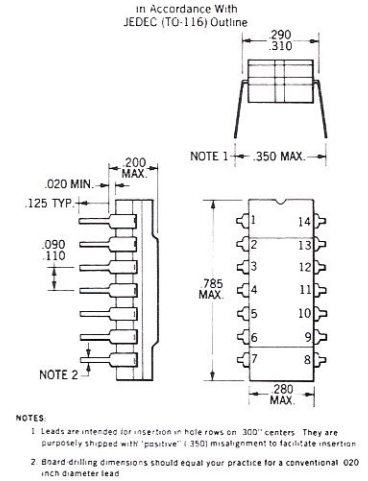
CCSL MICROMATRIX™ QUARTER-CELL

A FAIRCHILD COMPATIBLE CURRENT SINKING LOGIC PRODUCT

GENERAL DESCRIPTION — The 4501 consists of a single 4-input DTμL gate designed for use in breadboarding the 4500 Micromatrix™. It corresponds to one of the 32 quarter-cells available in the 4500 Micromatrix array. Logic flexibility is offered with pin options for interconnections of four independent elements. These elements are a) 4-diode cluster, b) non-inverting amplifier, c) common emitter inverting amplifier and d) load resistor.

PHYSICAL DIMENSIONS

TYPICAL DUAL IN-LINE PACKAGE



NOTES:
1. Leads are intended for insertion in hole rows on .300" centers. They are purposely shipped with "positive" (.350) misalignment to facilitate insertion.
2. Board-drilling dimensions should equal your practice for a conventional .020 inch diameter lead.

FEATURES

- **Offers 4500 Micromatrix breadboarding capability**
- **Compatible with all CCSL devices**

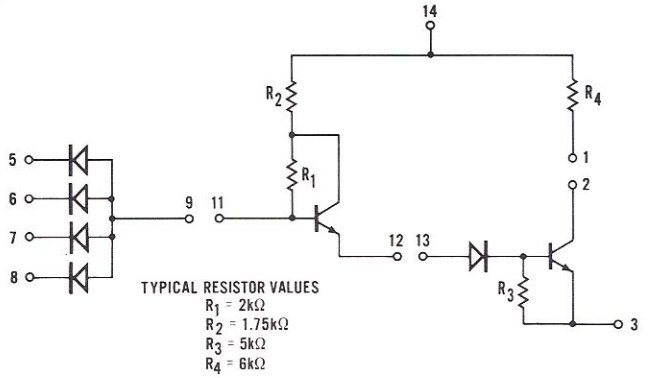
ABSOLUTE MAXIMUM RATINGS

V_{CC} Pin Potential to Ground Pin	−.5 V to +7 V
Input Voltage	−.5 V to +5.5 V
Voltage Applied to Outputs	−.5 V to +V_{CC} Value
Storage Temperature	−65°C to +150°C
Temperature (ambient) under Bias	−55°C to +125°C

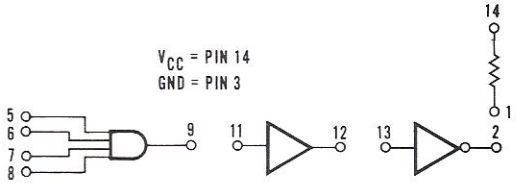
ORDER INFORMATION

Specify A6A45015XX, where 5XX is 51X for −55°C to +125°C temperature range or 59X for the 0°C to +75°C temperature range.
To order 4500 design kit, specify A6A4501KTX

CIRCUIT SCHEMATIC (PIN NUMBERS)



LOGIC DIAGRAM (PIN NUMBERS)



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FAIRCHILD 4500 MICROMATRIX™ • 4501 QUARTER-CELL

ELECTRICAL CHARACTERISTICS ($T_A = -55°C$ to $+125°C$, $V_{CC} = 5.0V = 10\%$) Connected as NAND gate with pull-up resistor

MILITARY TEMPERATURE RANGE

SYMBOL	CHARACTERISTIC	LIMITS −55°C MIN.	LIMITS −55°C MAX.	LIMITS +25°C MIN.	LIMITS +25°C TYP.	LIMITS +25°C MAX.	LIMITS +125°C MIN.	LIMITS +125°C MAX.	UNITS	CONDITIONS
V_{OH}	Output High Voltage	2.6		2.6	3.4		2.5		Volts	$V_{CC} = 4.5$ V $I_{OH} = -180\ \mu A$ V_{IL} on any input
V_{OL}	Output Low Voltage		0.4		0.22	0.4		0.4	Volts	$V_{CC} = 5.5$ V $I_{OL} = 8$ mA $V_{CC} = 4.5$ V $I_{OL} = 6.2$ mA
V_{IH}	Input High Voltage	2.1		1.9			1.7		Volts	Guaranteed input high threshold for all inputs
V_{IL}	Input Low Voltage		1.3			1.0		0.7	Volts	Guaranteed input low threshold for all inputs
I_F	Input Load Current		1.6		1.18	1.6		1.6	mA	$V_{CC} = 5.5$ V $V_F = 0.4$ V
			1.24		0.91	1.24		1.24	mA	$V_{CC} = 4.5$ V $V_F = 0.4$ V
I_R	Input Leakage Current					2		10	μA	$V_R = 4$ V, GND on other inputs
P_D	Power Dissipation					15.5			mW	$V_{CC} = 5$ V Inputs open, pull-up connected
						8.8			mW	$V_{CC} = 5$ V Any input grounded

ELECTRICAL CHARACTERISTICS ($T_A = 0°C$ to $+75°C$, $V_{CC} = 5.0$ V $= 5\%$) Connected as NAND gate with pull-up resistor

INDUSTRIAL TEMPERATURE RANGE

SYMBOL	CHARACTERISTIC	LIMITS 0°C MIN.	LIMITS 0°C MAX.	LIMITS +25°C MIN.	LIMITS +25°C TYP.	LIMITS +25°C MAX.	LIMITS +75°C MIN.	LIMITS +75°C MAX.	UNITS	CONDITIONS
V_{OH}	Output High Voltage	2.6		2.6	3.65		2.5		Volts	$V_{CC} = 4.75$ V $I_{OH} = -180\ \mu A$ V_{IL} on any input
V_{OL}	Output Low Voltage		0.45		0.22	0.45		0.45	Volts	$V_{CC} = 5.25$ V $I_{OL} = 9.6$ mA $V_{CC} = 4.75$ V $I_{OL} = 8.5$ mA
V_{IH}	Input High Voltage	2.0		1.9			1.8		Volts	Guaranteed input high threshold for all inputs
V_{IL}	Input Low Voltage		1.1			1.0		0.8	Volts	Guaranteed input low threshold for all inputs
I_F	Input Load Current		1.6		1.09	1.6		1.6	mA	$V_{CC} = 5.25$ V $V_F = 0.45$ V
			1.41		0.96	1.41		1.41	mA	$V_{CC} = 4.75$ V $V_F = 0.45$ V
I_R	Input Leakage Current					5		10	μA	$V_R = 4$ V, GND on other inputs
P_D	Power Dissipation					16.5			mW	$V_{CC} = 5$ V Inputs open, pull-up connected
						9			mW	$V_{CC} = 5$ V Any input grounded

Loading and interconnections for 4501 are identical to 4500 Micromatrix array except for Note 3.

LOADING RULES

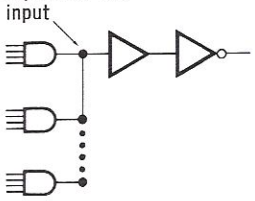
Connected as NAND gate with pull-up resistor

Fan-in 1 DTμL unit load

	Fan-out	
Load	51X	59X
DTL	5	6
TTL	3	3

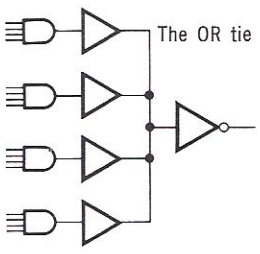
INTERCONNECTION RULES

Expanding the input



Maximum fan-in — 20 inputs corresponding to 5 diode clusters.
Fan-out — same as NAND gate.

The OR tie



If OR tie is utilized, 4501 fan-out is restricted to 3 unit loads for 51X temperature range operation (4 unit loads for 59X temperature range.) (Note 3.)

Maximum of 4 OR ties allowed.

Note 3: Fan-out of 5 (6 for 59X temperature range) with OR tie used, can be maintained if temperature range of operation is limited to +15°C to +125°C (+15°C to +75°C for 59X temperature range.)

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